

# Showcase of Innovation

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For its new owner, Werner Schlüter, the complete renovation of a country hotel into a four star accommodation represented a great opportunity to highlight the benefits and endless applications for tile and stone.



Initially, the architects were reluctant to install such a large quantity of tile in a hotel. The plan for the renovation of the Four Seasons Hotel (Hotel Vierjahreszeiten) included over 64,000-square-feet of interior and exterior hard surface coverings. Now completed, this ceramic tile showcase, located in Iserlohn, Germany, serves as the perfect illustration of the vast opportunities available to the tile and stone industry.

It is widely known that ceramic and stone tiles feature a unique combination of properties that make them ideal surface coverings for floors and walls. Aesthetically, tiled coverings evoke a sense of luxury and exceptional quality; and with the vast selection of shapes, sizes, textures, and colors available today, creative design possibilities are virtually limitless. Functionally, tile is durable, easy to maintain, and hygienic. In a high-traffic application such as a hotel, these aesthetic and functional qualities are not only ideal ... they are vital.

Given these qualities, the architects were still intimidated by the idea of installing hard surface coverings on every floor of this hospitality establishment, primarily due to the potential for sound transmission. However, Mr. Schlüter was persistent in his mission to prove that, in addition to its other benefits, a tiled floor can also be warm, comfortable, and quiet.

He was successful. Walking on the hotel's tiled floors, guests are unable to hear the sounds of their own footsteps. Even in the busy lobby area, the anticipated echoes are nonexistent. This is impressive, since the only carpeted areas of the hotel include a small strip in the hallway, and a section of the conference area.

The hotel boasts 72 guest rooms, 2 restaurants, a cozy bar, a huge outdoor terrace, a versatile convention center, and a complete wellness center, including a sauna, fitness area, and luxurious spa. Throughout its entire interior space, the hotel's atmosphere is warm and inviting. The colors and patterns integrated into the tiled floors and walls, complemented by the choice of furniture and décor, contribute to this sensation.



Overlooking the lake, the 3,700-square-foot terrace is covered with Korzilius' Mont Martre tile. Though used exclusively in the summer months, this generous exterior seating area is a remarkable example of the potential for exterior tile applications, even in a northern climate.

The guest bathrooms, in which the incorporation of tile is expected, are particularly impressive. Schluter®-RONDEC and SCHIENE trim profiles were installed to protect and decorate outside corners of tiled edges. The designer specified stainless steel profiles to match the aesthetics and quality of the high-end bathroom fixtures. Where tiled surfaces meet in vertical corners and floor-to-wall connections, Schluter®-DILEX expansion joints create graceful, hygienic corners, eliminating the need for caulking. Through the effective use of movement and trim profiles, the guest bathrooms, not to mention the spa, restaurants, and state-of-the-art kitchen, are maintenance-free and visually stunning.

Probably the most unique ceramic tile application in the hotel's design is the guest rooms. Complete with every high-tech accessory that a business traveler requires, the well-appointed guest rooms are warm, comfortable, and cozy. Compared to a typical hotel, in which the floors would be carpeted, the Four Seasons Hotel's guest quarters are exceptionally easy to maintain, which undoubtedly meets the approval of the cleaning staff.

The Four Seasons Hotel represents an innovative approach in every aspect of its complete renovation. In fact, through the use of two diesel generators, it creates all of its own energy, including all of the required electricity and hot water for the kitchens, bathrooms, and the integrated radiant heating tubes. Consequently, the hotel is entirely self-sufficient.



Installing the screed over the radiant tubes and Schluter®-BEKOTEC

How was it possible to create this warm, inviting atmosphere in a hotel completely covered in ceramic tile? The solution lies beneath the surface. The floor assembly was constructed with integrated radiant heat, along with sound and heat insulation. These features were easily incorporated using innovative installation methods.

Radiant heat is arguably the most highly efficient heating method in existence. The floors of the Four Seasons Hotel were constructed using the Schluter®-BEKOTEC Modular Screed™ system, which was developed specifically to address the negative perceptions associated with tiled surfaces, such as cracked tile, coldness, noise, weight, and construction time.

A conventional radiant heated floor assembly consists of the following components: 1) an insulating layer, which is placed either beneath or on top of the subfloor; 2) heating tubes, which are installed with special fasteners; and 3) a thermal mass comprised of approximately 2 inches of poured screed, or mortar, which is placed over the tubes. When warm water flows through the tubes, the screed mass both stores and radiates the heat. The insulation layer beneath the assembly ensures that the heat radiates up through the floor, effectively heating the living space, and preventing heat loss below the assembly.

In this conventional installation, however, stresses occur while the screed cures. The screed typically shrinks, and sometimes curls during the curing and evaporation process. In fact, a self-supporting screed can shrink up to 1/8" per 10 feet. These stresses in the screed manifest themselves as long, continuous cracks. These cracks will ultimately transfer to the finished tiled covering, creating permanent damage. Therefore, control joints are installed at regular intervals in the screed to control the location of these cracks.

A Modular Screed system, on the other hand, is comprised of lightweight studded polystyrene panels. Microfine cracks develop between the studs during the curing process, effectively dividing the screed into smaller, 4-1/2" modules. This confines the curing stresses to each module, eliminating the need for control joints in the screed. Therefore, freedom of design is possible in the tiled covering, as it is much easier to match surface movement joints to the pattern of the tile or stone covering, instead of matching the surface joint to the joint in the screed below.

The lightweight BEKOTEC panels, which also serve as a thermal break, are integrated with the thermal mass (as opposed to two separate elements), and displace about half of the screed mass that is used in a conventional installation. Since the screed

mass to be heated is much smaller, recovery time is much quicker than can be achieved with conventional systems, further increasing energy efficiency. Additionally, the heating tubes in this system are very close to the surface of the tiled covering, resulting in a much faster response time and precise control of the room temperature at lower water temperatures, significantly reducing energy costs. The smaller amount of screed material required, in addition to the ease of installation, also decreases installation time and the weight of the assembly.



The complete system includes Schluter®-DITRA uncoupling membrane, which is installed between the screed and the finished tiled covering. Although the Schluter®-BEKOTEC Modular Screed panel neutralizes stresses in the screed through the formation of microfine cracks between the studs, the covering itself requires an uncoupling membrane in order to compensate for the expansion and contraction that occurs during the heating and cooling cycles. A screed that is subjected to these cycles can expand at almost twice the rate of the tiled covering.

Additionally, the open rib structure of the DITRA effectively distributes the heat evenly throughout the floor covering and eliminates thermal striping, which is common in conventional radiant heated flooring assemblies.

The Four Seasons' "Wintergarten" restaurant serves as an excellent example of the benefits of this installation system. The Wintergarten is a spacious, bright, glass structure that seats 50 people and is used as a restaurant and breakfast area.

The floor construction began on a Wednesday when the BEKOTEC panels were placed on top of an additional insulation layer and the heating tubes were simply set into the studs of the BEKOTEC without fasteners. On Thursday, the screed was poured on top of the BEKOTEC. Friday, the DITRA was installed. Tile setting began immediately, and was completed on Saturday. With the floors completed, other contractors were then able to access that room to work on the ceiling and walls.

Today's installation systems provide the design community, construction industry, tile contractor, and end user with all of the tools necessary to produce a durable and functional finished product, in applications that were never before imagined. The potential opportunities this represents for the hard surface covering industry are staggering.

Largely due to the ease of the floor installation, the entire renovation of this four-star establishment was completed in only 7 months. The application of a completely unique approach to this renovation resulted in this self-sufficient model of energy efficiency. With over 10 times the quantity of tiled surfaces as compared to a traditional hotel, the Four Seasons Hotel exemplifies innovation in design.